REMARKS

The following remarks are made in response to the Final Office Action mailed February 6, 2006. In that Office Action, the Examiner rejected claims 1-30 under 35 U.S.C. §103(a) as being unpatentable over Kaneko, U.S. Patent No. 6,427,184 ("Kaneko") in view of Bates, Jr., et al., U.S. Patent No. 6,253,289 ("Bates").

With this Response, claim 1 has been amended. Claims 1-30 remain pending in the application and are presented for reconsideration and allowance.

35 U.S.C. §103 Rejections

The Examiner rejected claims 1-30 under 35 U.S.C. §103(a) as being unpatentable over Kaneko, U.S. Patent No. 6,427,184 ("Kaneko") in view of Bates, Jr., et al., U.S. Patent No. 6,253,289 ("Bates").

Amended independent claim 1 recites "a sequential read detector configured to generate a new sequential read indication for the current host command if the current host command and a previously received host command specify read operations that are non-sequential", "a transfer length generator configured to provide a first transfer length value to the data storage device if the new sequential read indication is generated for the current host command, thereby requesting data specified by the current host command and prefetch data, and provide a second transfer length value to the data storage device if the new sequential read indication is not generated for the current host command", and "wherein the first transfer length value is determined by adding a prefetch value to a transfer length value specified in the current host command." Kaneko and Bates, either alone or together, do not teach or suggest adding a prefetch value to a transfer length value specified in a current non-sequential read command, and then providing this sum to a data storage device.

With respect to independent claim 1, the Examiner stated that:

> With respect to claim 1, Kaneko et al. only implicitly refer to the limitation of "**wherein the first transfer length value is determined by adding a prefetch value to a transfer length value specified in the current host command**" [the corresponding "prefetch value" is the "prefetch size" as shown in figure 2 associated with each of the I/O stream requests, noted that the parameter "prefetch size" is independent, and in addition to, the parameter "I/O stream size;" the flowchart in figure 3 shows that, when it is a sequential

> I/O stream (YES on step S103), the I/O stream size will be updated (step S104) by calling the prefetch activator (step S108), which calculates a prefetch start address from "stream start address" and "prefetch size" to newly activate a prefetch (column 5, lines 61-65; column 7, lines 7-20)].
>
> Further, Bates, Jr. et al. explicitly teach in their invention "Maximizing Sequential Read Streams While Minimizing the Impact on Cache and Other Applications" a method and apparatus of maximizing sequential read streams in a data storage device [abstract] in which the prefetch size (i.e., the data transfer length) equals the sum of a previous prefetch size and a read request size [figure 3, step 64].
>
> Therefore, it would have been obvious for one of ordinary skills in the art at the time of Applicants' invention to recognize the common and widely adopted practice of using adding a prefetch value to a requested data-read size to determine the starting address as well as the total data transfer size, as demonstrated by Bates, Jr. et al. explicitly and by Kaneko et al. implicitly, and the lack of patentable significance of this limitation. (Final Office Action at para. no. 5, pages 3-4) (emphasis in original).

Applicant respectfully disagrees with the Examiner's statement above that Kaneko et al. "implicitly refer" to the limitation "wherein the first transfer length value is determined by adding a prefetch value to a transfer length value specified in the current host command". Kaneko discloses a table 4 (Figure 1) that includes an "[I/O stream size]" field. Kaneko discloses that this field is updated for sequential I/O streams or near sequential I/O streams by adding the size of the current I/O stream to the previous value in the "[I/O stream size]" field. (Kaneko at col. 4, lines 54-61). Thus, this field represents the size "of the whole I/O stream". (Kaneko at col. 4, lines 60-61). There is no teaching or suggestion in Kaneko to add a prefetch value to the I/O stream size specified in a current I/O stream, and then providing this sum to a data storage device. Rather, as indicated above, Kaneko discloses that the current I/O stream size is added to the previous I/O stream sizes, and this sum gives an indication of the size of the whole I/O stream.

Kaneko also discloses that table 4 includes a "[prefetch size]" field. (Kaneko at col. 4, line 41). However, there is no teaching or suggestion in Kaneko to add the value in this field to the I/O stream size specified in a current I/O stream, and then provide this sum to a data storage device. Rather, Kaneko appears to perform a prefetch as a separate internal transfer following a transfer requested by the host 2. (See, e.g., Kaneko at col. 5, lines 52-65). Thus, as the Examiner appears to have acknowledged by citing the Bates reference, Kaneko does not teach or suggest adding a prefetch value to a transfer length value specified

in a current non-sequential read command, and then providing this sum to a data storage device.

As the Examiner pointed out, Bates discloses in step 64 of the flow diagram shown in Figure 3 that "prefetch size = previous prefetch size plus read req. size". However, Bates discloses that "prefetch operations are performed only when they are most effective, i.e. for sequential read streams." (Bates at col. 2, lines 2-3; see also Bates at col. 1, lines 60-62; col. 2, lines 46-47; col. 5, lines 20-21; col. 6, lines 14-25). Thus, the calculation at step 64 in Figure 3 of Bates is only performed for a sequential read stream. In contrast, claim 1 recites that the first transfer length value [determined by adding a prefetch value to a transfer length value specified in the current host command] is provided to the data storage device "if the current host command and a previously received host command specify read operations that are **non-sequential**". Bates does not teach or suggest performing the calculation in step 64 in Figure 3 for a non-sequential read operation, and, in fact, teaches away from doing so. Thus, like Kaneko, Bates also does not teach or suggest adding a prefetch value to a transfer length value specified in a current non-sequential read command, and then providing this sum to a data storage device.

In addition, claim 1, as amended herein, recites "a transfer length generator configured to provide a first transfer length value to the data storage device if the new sequential read indication is generated for the current host command, **thereby requesting data specified by the current host command and prefetch data**". Kaneko and Bates, either alone or together, do not teach or suggest adding a prefetch value to a transfer length value specified in a current non-sequential read command, and then providing this sum to a data storage device, thereby requesting data specified by the current host command and prefetch data. Rather, Kaneko and Bates both appear to perform a prefetch as a separate internal transfer following a transfer requested by a host. (See, e.g., Kaneko at col. 5, lines 52-65; Bates at Figure 3 and corresponding description).

In view of the above, independent claim 1 is not taught or suggested by Kaneko and Bates, either alone, or together. Applicant respectfully requests removal of the rejection of claim 1 under 35 U.S.C. §103(a), and requests allowance of this claim. Since dependent claims 2-11 further define patentably distinct claim 1, and are further distinguishable over the cited references, claims 2-11 are believed to be allowable over the cited prior art. Applicant

respectfully requests removal of the rejection of claims 2-11 under 35 U.S.C. §103(a), and requests allowance of these claims.

Independent claim 12 recites "adding a prefetch length value to the first transfer length value if the current read command and the previous read command are non-sequential, thereby generating a second transfer length value; and outputting the second transfer length value to the data storage device." As described above with respect to claim 1, there is no teaching or suggestion in Kaneko or Bates regarding adding a prefetch value to a transfer length value specified in a current **non-sequential** read command, and then providing this sum to a data storage device. For the reasons set forth above with respect to claim 1, Kaneko and Bates do not teach or suggest the above-quoted limitations of claim 12.

In view of the above, independent claim 12 is not taught or suggested by Kaneko and Bates. Applicant respectfully requests removal of the rejection of claim 12 under 35 U.S.C. §103(a), and requests allowance of this claim. Since dependent claims 13-16 further define patentably distinct claim 12, and are further distinguishable over the cited references, claims 13-16 are believed to be allowable over the cited prior art. Applicant respectfully requests removal of the rejection of claims 13-16 under 35 U.S.C. §103(a), and requests allowance of these claims.

Independent claim 17 recites "transfer length generation means for adding a prefetch length value to a transfer length value specified in the current host command if the current host command specifies a non-sequential read operation, the transfer length generation means configured to output a sum of the prefetch length value and the transfer length value to the storage means." As described above with respect to claim 1, there is no teaching or suggestion in Kaneko or Bates regarding adding a prefetch value to a transfer length value specified in a current **non-sequential** read command, and then providing this sum to a data storage device. For the reasons set forth above with respect to claim 1, Kaneko and Bates do not teach or suggest the above-quoted limitations of claim 17.

In view of the above, independent claim 17 is not taught or suggested by Kaneko and Bates. Applicant respectfully requests removal of the rejection of claim 17 under 35 U.S.C. §103(a), and requests allowance of this claim. Since dependent claims 18 and 19 further define patentably distinct claim 17, and are further distinguishable over the cited references, claims 18 and 19 are believed to be allowable over the cited prior art. Applicant respectfully

requests removal of the rejection of claims 18 and 19 under 35 U.S.C. §103(a), and requests allowance of these claims.

Independent claim 20 recites "generating a new sequential read indication for the current host command if the current host command and a previously received host command specify read operations that are non-sequential; outputting a first transfer length value to the data storage device if the new sequential read indication is generated for the current host command, wherein the first transfer length value is determined by adding a prefetch value to a transfer length value specified in the current host command; and outputting a second transfer length value to the data storage device if the new sequential read indication is not generated for the current host command, the second transfer length value less than the first transfer length value." As described above with respect to claim 1, there is no teaching or suggestion in Kaneko or Bates regarding adding a prefetch value to a transfer length value specified in a current **non-sequential** read command, and then providing this sum to a data storage device. For the reasons set forth above with respect to claim 1, Kaneko and Bates do not teach or suggest the above-quoted limitations of claim 20.

In view of the above, independent claim 20 is not taught or suggested by Kaneko and Bates. Applicant respectfully requests removal of the rejection of claim 20 under 35 U.S.C. §103(a), and requests allowance of this claim. Since dependent claims 21-30 further define patentably distinct claim 20, and are further distinguishable over the cited references, claims 21-30 are believed to be allowable over the cited prior art. Applicant respectfully requests removal of the rejection of claims 21-30 under 35 U.S.C. §103(a), and requests allowance of these claims.

CONCLUSION

In view of the above, Applicant respectfully submits that pending claims 1-30 are in form for allowance and are not taught or suggested by the cited references. Therefore, reconsideration and withdrawal of the rejections and allowance of claims 1-30 is respectfully requested.

No fees are required under 37 C.F.R. 1.16(h)(i). However, if such fees are required, the Patent Office is hereby authorized to charge Deposit Account No. 08-2025.

Amendment/Reply
Applicant: Robin Alexis Takasugi et al.
Serial No.: 10/672,975
Filed: September 26, 2003
Docket No.: 10014268-1 (H303.154.101)
Title: PREFETCH CONTROLLER FOR CONTROLLING RETRIEVAL OF DATA FROM A DATA STORAGE DEVICE

The Examiner is invited to contact the Applicant's representative at the below-listed telephone numbers to facilitate prosecution of this application.

Any inquiry regarding this Amendment/Reply should be directed Jeff A. Holmen at Telephone No. (612) 573-0178, Facsimile No. (612) 573-2005. In addition, all correspondence should continue to be directed to the following address:

IP Administration
Legal Department, M/S 35
HEWLETT-PACKARD COMPANY
P.O. Box 272400
Fort Collins, Colorado 80527-2400

Respectfully submitted,

Robin Alexis Takasugi et al.

By their attorneys,

DICKE, BILLIG & CZAJA, PLLC
Fifth Street Towers, Suite 2250
100 South Fifth Street
Minneapolis, MN 55402
Telephone: (612) 573-0178
Facsimile: (612) 573-2005

Date: 3/28/06
JAH:jmc

Jeff A. Holmen
Reg. No. 38,492

CERTIFICATE UNDER 37 C.F.R. 1.8:

The undersigned hereby certifies that this paper or papers, as described herein, are being transmitted via facsimile to Facsimile No. (571) 273-8300 on this 28th day of March, 2006.

By: _____
Name: Jeff A. Holmen